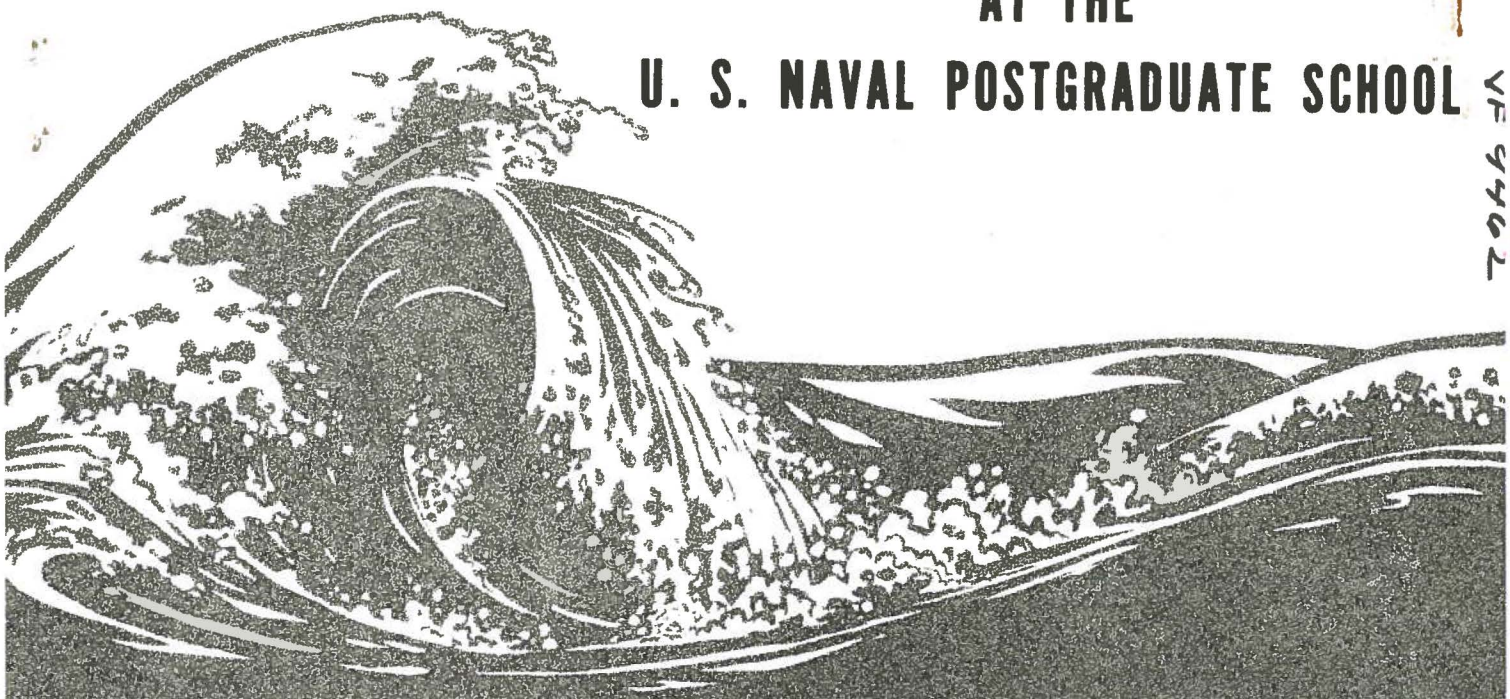
1974

The Naval Postgraduate School

Kelle, Karl-Heinz

Monterey, California. Naval Postgraduate School

GERMAN OFFICERS AT THE U. S. NAVAL POSTGRADUATE SCHOOL



NAVAL POSTGRADUATE SCHOOL
EXCELLENCE THROUGH EDUCATION

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIFORNIA

D 20178 E

10

TRUPPEN PRAXIS

AUS DEM INHALT

FÜHRUNG, TECHNIK UND AUSBILDUNG FÜR DEN OFFIZIER DER BUNDESWEHR

The following is an English translation of an article that originally appeared in German in the October 1974 issue of Truppenpraxis, an official publication for armed forces officers of the Federal Republic of Germany. Author of the article was Lieutenant Commander Karl-Heinz Kelle, who was graduated from the Naval Postgraduate School in June 1972 with the degree of Master of Science in Electrical Engineering.

MARINE

NAVAL POSTGRADUATE SCHOOL
Monterey/California

Korvettenkapitän Karl-Heinz Kelle, MSEE

Im Herbst 1973 haben die Hochschulen der Bundeswehr den Lehrbetrieb aufgenommen. Andere Nationen haben sich ähnliche Einrichtungen geschaffen. Hier wird die Naval Postgraduate School der US Navy vorgestellt. Seit 1963 studieren deutsche Marineoffiziere dort. Nach einer kurzen Beschreibung von Schule und Standort werden das Studienangebot, die Studienordnung und der Studienverlauf erläutert. Zum Schluß wird untersucht, ob es sinnvoll ist, auch in Zukunft deutsche Marineoffiziere dort studieren zu lassen. Der Autor hat in Monterey „Ordnance Systems Engineering" studiert.

Auftrag

„To conduct and direct the Advanced Education of comissioned officers and to provide such other technical and professional instruction as may be prescribed to meet the needs of the Naval Service; and in support of the foregoing, to foster and encourage a program of research in order to sustain academic excellence."[1])

Geschichte

Die Naval Postgraduate School (NPS) ist im 66. Jahr ihres Bestehens. Gegründet am 9. Juni 1909, begann sie als eine Abteilung der US Naval Academy / Annapolis; ein bescheidener Beginn mit drei Professoren und zehn Offizieren (Studenten). Als einziges Fach wurde Marine-Ingenieurwesen gelehrt.

Nach dem Ersten Weltkrieg wurde das Lehrangebot um zusätzliche technische Fächer (Maschinenbau, Elektro-, Waffen-, Fernmelde- und Luftfahrttechnik) erweitert. 1927 wurde ein spezielles Curriculum für jüngere Seeoffiziere geschaffen, um sie mit modernen Entwicklungen in der Marine vertraut zu machen und sie für ihre späteren Aufgaben als Führer in See vorzubereiten und fortzubilden.

Gegen Ende des Zweiten Weltkrieges begannen Bestrebungen, die Naval Academy und die Postgraduate School zu trennen und den akademischen Standard der letzteren auf Hochschulniveau anzuheben.

Diese Ideen wurden bis 1948 abgeschlossen.

Der Kongreß der Vereinigten Staaten begründete die Hochschule als eigenständige Institution unter einem Superintendenten (Marineoffizier) und einem akademischen Dekan (Wissenschaftler). Der Superintendent erhielt die Befugnis, auf Vorschlag des Dekans, akademische Grade (Bachelor of Science/Arts, Master of Science, Doctor of Philosophie)[2]) zu verleihen.

Am 22. Dezember 1951 öffnete die NPS die Tore in ihrem heutigen Domizil, den Gebäuden des ehemaligen Luxus-Hotels „Del Monte", in Monterey, Kalifornien, USA.

Die Postgraduate School bestand aus der

- Technischen Schule
- Seeoffiziers-Schule und der
- Management-Schule (seit 1956).

Diese drei selbständigen Abteilungen wurden 1962, unter Vereinheitlichung des Auftrages, der Zielrichtung und des Durchführungsmodus, zu einem einheitlichen Ganzen, zu einer Marineuniversität, der **Naval Postgraduate School,** zusammengefaßt.

Monterey

Etwa 200 km südlich von San Franzisko, am südlichen Teil der „Monterey Bay", liegt, inmitten mehrerer kleiner Kommunen, Monterey an der Küste des Pazifischen Ozeans.

Die Bucht wurde 1542 entdeckt, der Ort aber erst 1770 von Gaspar de Portola und Pater Junipero Serra gegründet und besiedelt (Garnison und Missionskirche).

Für amerikanische (Westküsten-)Verhältnisse besitzt Monterey eine reiche Tradition, wurde es doch 1822 Hauptstadt der mexikanischen Provinz Kalifornien. 1846 von den USA beansprucht, blieb die Stadt das Zentrum Kaliforniens, bis ihr, bedingt durch den Goldrausch, San Franzisko diesen Rang nahm.

---

1) Auftrag der Naval Postgraduate School gemäß der Definition des Marineministers der USA: „Die Fortbildung der Berufsoffiziere gezielt durchzuführen und technische und berufliche Unterweisung, wie sie für die Notwendigkeiten der Marine erforderlich sind, bereitzustellen. Als Unterstützung des Vorherigen sind Forschungsprogramme zu fördern, um ein hohes wissenschaftliches Niveau aufrechtzuerhalten".

2) Baccalaureat, Magister (dem deutschen Diplom ungefähr gleichzusetzen), Doktor der Philosophie hinzugekommen ist in drei Fakultäten der Grad des „Engineer", als höchster, berufsmäßig orientierter, Ingenieur-Grad im Gegensatz zum mehr forschungsorientierten Doktor der Philosophie.
1946 bis Ende 1971 graduierten/promovierten an der Naval Postgraduate School: 5193 Bachelors of Science, 4687 Masters of Science, 101 Engineers, 42 Doctors of Philosophy.

THE NAVAL POSTGRADUATE SCHOOL

Monterey, California

by

Lieutenant Commander K. H. Kelle

Abstract

In the fall of 1973 the universities of the German Armed Forces began their operation. These institutions are similar to those of other nations, one of which, the United States Naval Postgraduate School, where German naval officers have studied since 1963, is described in this article. After a short description of the school and its location, the offerings, operations, and curricula are reviewed. Finally, the feasibility of continued study at the school by German naval officers is addressed. The author is a former student of Ordnance Systems Engineering at the school.

MISSION OF THE SCHOOL

"To conduct and direct the advanced education of commissioned officers and to provide such other technical and professional instruction as may be prescribed to meet the needs of the Naval Service; and in support of the foregoing, to foster and encourage a program of research in order to sustain academic excellence."

History of the School

The Naval Postgraduate School (NPS) is in the 66th year of its existence. Founded on June 9, 1909, it had a modest beginning at the U. S. Naval Academy in Annapolis, Maryland, with three professors and ten officer students. The only curriculum offered was Naval Engineering.

After World War I, the curricula available were expanded to include such technical subjects as Mechanical Engineering, Electrical Engineering, Ordnance Engineering, Communications, and Aero Engineering. In 1927, a special curriculum for junior naval officers was introduced to provide familiarization with modern developments in the Navy, as well as to prepare and to educate them for their future duties as leaders at sea.

Towards the end of World War II, a beginning was made in reconstituting the Postgraduate School as an institution separate from the Naval Academy, with full university status and attendant academic standards. This evolution came to fruition in 1948 when the Congress of the United States enacted legislation to authorize the existence of the Postgraduate School as a separate institution under a Superintendent, who is a Navy officer, and an Academic Dean, a scientist. The Superintendent was vested with the authority to confer academic degrees at the recommendation of the Academic Dean. The degrees granted by the school were to include Bachelor of Science, Bachelor of Arts, Master of Science and Doctor of Philosophy.

On December 22, 1951, the NPS opened its doors at its present location in Monterey, California. The Postgraduate School consisted, at this stage of development, of three schools: the Engineering School, the General Line School, and the Management School. In 1962 these separate schools were combined to form a single Navy university by combining their missions, g ls, and operations.

Monterey is located among other small communities about 110 miles south of San Francisco at the southern part of the Monterey Bay. The bay was discovered in 1542, but the town was not founded and settled until 1770 by Gaspar de Portola and Father Junipero Serra, who established a garrison and mission church.

Compared to other west coast communities, Monterey is rich with history. In 1822 it became capital of the Mexican Province, California. In 1846 it was claimed by the United States, and remained the cultural hub of California until displaced by San Francisco during the Gold Rush.

Because of its stimulating geographic location in a beautiful coastal setting, Monterey gained fame between the two World Wars as a tourist haven, in addition to its previously established position as a resort for the well-to-do. Artists' colonies like Carmel and Big Sur, the wealth and landscape, and the quaint atmosphere of a fishing town combined to give Monterey a particular charm. John Steinbeck and Henry Miller are two examples of the many authors whose writings have popularized Monterey and its surrounding area.

The School

The NPS is headed by a Rear Admiral, the Superintendent. He is supported by the Academic Dean, who is head of the civilian faculty, and by three Captains: the Chief of Staff, the Director of Programs and the Director of Military Operations and Logistics.

The School is composed of various academic departments. The departments are: Meteorology, Electrical Engineering, Mathematics, Operations Research and Administrative Sciences, Government, Aeronautics, Oceanography, Mechanical Engineering, and Physics and Chemistry. The courses of study are combined into the following curricula:

Aeronautical Engineering
Baccalaureate
Electronics and Communications Engineering
Engineering Science
Environmental Science
Administrative and Computer Science
Naval Engineering and Engineering Science
Operations Research
Weapons Engineering
Intelligence

The students are given organizational and administrative support as well as necessary academic and military counseling in the curricular office. These curricular offices are headed by staff officers who have corresponding university educations. Associated with each curricular officer is a faculty member called the academic associate who deals with the technical academic matters. This team acts as a cooperative guidance unit. The faculty is composed of more than 85% civilian professors who are assistant professors, associate professors, and full professors. The remainder of the faculty, so-called instructors, are mostly naval officers who have earned a Ph.D.

With a student body of about 1200 to 1400, the student-instructor ratio is about four or five to one. Besides excellent quantitative and qualitative equipment (for example a 100 MeV linear electron accelerator) the Naval Postgraduate School offers its own library and its own computer center.

This library contains, besides some special collections, about 130,000 volumes or bound periodicals, 2500 different periodicals, 150,000 technical documents, and about 65,000 microfilms. If title, author, or call number are not sufficient information for locating sources, one can search for the required literature with the aid of a computer control.

The Postgraduate School has been using computers since 1954. It has had its own computer center since 1960. The present system consists of two IBM 360s-67 with 786,000* bytes of core memory. Drum, record, and band memory as well as plotters, graphical consoles and 30 decentralized terminals complete the system.

Study Order

The academic year at the Naval Postgraduate School is organized differently from that at comparable universities. It is divided not into semesters or trimesters, but into quarters of twelve weeks duration. There is a two-week break between quarters in summer and in winter. No classes are in session during the breaks.

The twelve weeks of a quarter consist of eleven weeks of classes and one examination week. Attendance at lectures and problem sessions is mandatory.

The academic departments supply the teaching staff and the course offerings. They determine the quantity and quality of the minimal requirements for qualification for a degree in a particular discipline.

The curricular office determines the program of study. Professional and subspecialty requirements of the Navy are determining factors of the curriculum in addition to the basic technical requirements.

Because of these strict guidelines, the students' basic courses are fairly standard. Variations are possible, but they must be well founded and have to be coordinated with the advisor or curricular officer.

*Since increased to 1,250,000 bytes.

Therefore, in the undergraduate studies, the course of instruction is carefully guided. In the graduate studies, which follow the basic courses, the possibilities of choice are considerably larger depending upon the area of specialization.

The average student takes four courses per quarter. These courses are:

a) Described according to specialty and academic level[2] - for instance EE 2810[1].

b) Specified according to the number of course hours per week. For instance, 4-2 describes 4 lecture hours and 2 laboratory hours.

c) The courses terminate at the end of the quarter. The courses, however, build on each other from quarter to quarter in a meaningful way or are interrelated.

The evaluation of a student's performance in each course is done at the end of the quarter. The grades range from A with value 4.0 (the highest) to X with value 0.0.

One requirement for the award of the Master of Science degree is a grade average of at least 3.0. Considering the small number of students in each course, about 5-15, and a mostly statistical distribution of the grade levels, one gets an idea of the work load of the individual officer student.

Footnotes:

(1) EE 2810 Digital Machines (3-3) Basic principles of digital system design with emphasis upon the organization and programming of simple computers. Elements of Boolean algebra and logic design. Storage organization and control. Input-output data flow. Relation of machine logic to program design. Laboratory services are devoted to study of computer logical elements processing, storage and I/O units: Prerequisite, CS 2100.

(2) Courses with numbers 1000-1999 are undergraduate courses, 2000-2999 are undergraduate upper division courses, 3000-3999 are graduate or upper division and 4000-4999 are graduate courses.

The Curriculum

By way of a special example, which is a representative curriculum, I will demonstrate a typical progression which leads to the Master of Science in Electrical Engineering in the Electronics and Communications Engineering curriculum.

Basic Requirements in the Department of Electrical Engineering

Undergraduate Requirements:

Approximately 50 course hours in prescribed areas of Electrical Engineering (basic Electrical Engineering and Electronics, Electromagnetism, Communication Theory, Computer, and Control Theory, at the 2000 level).

In addition, about 8 course-hours in elective topics of Electrical Engineering at the 2000 level.

About 15 course-hours of Mathematics.

About 6 course-hours of Physics and Chemistry.

Graduate Studies:

A minimum of 40 course-hours at the 3000 level or higher, and at least 12 course-hours at the 4000 level. Thirty of these 40 hours must be taken in the area of specialization.

An individual thesis must be prepared and presented and accepted by the department. The grade must be at least 3.0.

Typical Course of Study in the Electronics and Communications Engineering Curriculum

(See NPS Catalogue 1972/74 - Curriculum 590, 600, pages 33-34)

Specialization is possible in the following areas:

Electronics
Information and Control Engineering
Bio-Engineering
Computer System Engineering
Communication Engineering
Data Processing
Electronic Warfare

The described undergraduate requirements and the special example given should allow the reader a general idea. By no means should this lead to the impression that NPS is an institution that offers only predetermined study plans.

In spite of the relatively rigid study direction in the undergraduate portion and the extremely strict performance control, one finds here an educational system with considerable degrees of freedom.

These degrees of freedom lie in the following:

a) The quality of the material (most recent research results and technologies appear without delay in the offered courses).

b) The quantity of the material offered (to demonstrate the breadth, it may be mentioned for instance that in the Department of Electrical Engineering more than 75 different courses are offered, 30 of which are at the 4000 level).

c) The favorable instructor-student ratio.

d) The above-average study and working conditions, including the available facilities and the scientific and administrative support.

e) Optimal working and professional conditions for the faculty as well as the students. For example, faculty members are allowed one quarter per year to concentrate strictly on research.

The constant attention to their studies required of the students presents a distinct challenge. The perseverance required of students at NPS is well above that of comparable institutions. The quarterly summarized evaluation reminds one somewhat of 1984.

The pressure for quality performance and the short duration of each quarter results in a high mental and psychic strain which requires special motivation as well as the proper study atmosphere. The majority of the officer students are between 20 and 30 years of age. The first phase of their operational duties lies behind these officers. They have a foundation and are building on their experience. The professional motivation is there, and it is converted into a self-motivated readiness and willingness to perform.

The atmosphere at the school is conducive to this motivation. Without a doubt, NPS is a military university and easily recognized as such, although everybody except the staff officers wear civilian clothes. The military character shows in external things, like orderliness, bearing and neatness, but actually these signs are of minor importance. Of importance is that NPS is clearly a working university.

Universities of this kind often do not have an identity, or somehow appear artificial. Neither of these conditions exists at NPS. Reasons for this are:

a) The atmosphere among all participants--professors, members of the staff, and students--is relaxed and personal. The direct open and nonconventional way of the American people and perhaps also the familiar "you"

with the first name when directing each other (in all its friendly noncommittal way) contribute to this in an important way.

b) Exceptional diversions during free time. They range from scuba-diving to qualifying for a pilot's license.

c) The landscape, Monterey, and its surroundings at the Pacific ean give a natural balance to the challenge of studies.

d) The culture and charming atmosphere of San Francisco.

German Officers at the NPS

Since 1963 German Navy officers have studied at the Naval Postgraduate School. In 1973 and 1974 the first Army and Air Force officers joined their naval partners. So far 25 officers have completed their studies in Monterey and another 27 are presently enrolled.

The study plan of the German officers in principle does not differ from those described previously. The U. S. Navy does grant the German officer students a preparatory two quarters of studies. During these two quarters, mostly mathematical and physical basics are taught. This time also serves as a time of general acclimatization and of getting used to the English language.

After the establishment of the German Armed Forces universities, the question arises whether it is still meaningful for German officers to study in Monterey. The answer to this question can be very clearly formulated.

a) The education of German naval officers at NPS has proven useful. The curriculum is of a scientific nature with professional subspecialty orientation. The study conditions are optimal The officers are detached from operational or staff duties for only a relatively short time (no shorter study times can be obtained at comparable universities). Because of their previous operational experience and the newly obtained education, the officers can be used in positions of higher responsibility after a short start up. Study in a foreign country, particularly in one which is the main partner in the Atlantic Alliance, gives general insights which are necessary and useful for international cooperation. These basic principles should be systematically utilized and further developed.

b) The translation of Navy concepts into real systems and the realization of the arms directives require of the Navy the employment of problem oriented, well prepared, and technically competent officers. Graduates of the German Armed Forces University after their follow-on military tra ing and guided practical tour will not be available for corresponding pro ems and duties before the early eighties.

c) The Report of the Education Commission to the Secretary of Defense suggests qualifying the studies of German officers at the NPS in the present form as part of education stage C^1.

The possibility which NPS offers for advanced education and upgrading studies in other specialties should be evaluated and utilized.

Summary

With the Naval Postgraduate School the U. S. Navy has established an educational institution which:

a) convinces through its performance;

b) demonstrates its openness to the world through its multinational student body;

c) educates experienced officers in an atmosphere which provides the balance of academic freedom and professional necessity in a rather short time and prepares them well for their future duties.

Our Navy has utilized this opportunity for the education of its officers for a long time. Through this utilization, among other efforts, the Navy has distinctly improved the professional knowledge of selected officers. To utilize the opportunity and to employ the 20 so-educated officers in a meaningful, well planned way should be and remain our goal.

Footnote:

(1) In the Federal German Navy this is the education level required for general staff officers.